

Vishay Siliconix

N-Channel 60-V (D-S) MOSFET

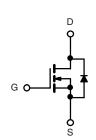
PRODUCT SUMMARY						
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^d	Q _g (Typ.)			
60	0.036 at V _{GS} = 10 V	8	10.5 nC			
00	0.043 at V _{GS} = 4.5 V	8	10.5110			

FEATURES

- Halogen-free According to IEC 61249-2-21
 Definition
- TrenchFET[®] Power MOSFET
- Optimized for "Low Side" Synchronous Rectifier Operation
- 100 % $\rm R_{a}$ and UIS Tested

APPLICATIONS

CCFL Inverter



N-Channel MOSFET

SO-8 S 8 D S D 2 7 S 3 6 D G 5 D 4 Top View

Ordering Information: Si4436DY-T1-E3 (Lead (Pb)-free) Si4436DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

Parameter	Symbol	Limit	Unit		
Drain-Source Voltage		V _{DS}	60	v	
Gate-Source Voltage		V _{GS}	± 20	v	
	T _C = 25 °C		8 ^a		
Continuous Drain Current (T _{.1} = 150 °C)	T _C = 70 °C		6.8		
Continuous Drain Current $(1) = 150^{\circ}$ C)	T _A = 25 °C		6.1 ^{b, c}		
	T _A = 70 °C		4.8 ^{b, c}		
Pulsed Drain Current	I _{DM}	25	— A		
Continuous Courses Durin Diada Current	T _C = 25 °C		4.2		
Continuous Source-Drain Diode Current	T _A = 25 °C	I _S	2.1 ^{b, c}		
Avalanche Current		I _{AS}	15		
Single-Pulse Avalanche Energy	L = 0.1 mH	E _{AS}	11.2	mJ	
	T _C = 25 °C		5		
Marian David Dissignation	T _C = 70 °C		3.2	14/	
Maximum Power Dissipation	T _A = 25 °C	P _D	2.5 ^{b, c}	W	
	T _A = 70 °C	1	1.6 ^{b, c}		
Operating Junction and Storage Temperature Rang	T _J , T _{stg}	- 55 to 150	°C		

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^{b, d}	t ≤ 10 s	R _{thJA}	38	50	°C/W	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	20	25	C/VV	

Notes:

a. Package limited.

b. Surface mounted on 1" x 1" FR4 board.

c. t = 10 s.

d. Maximum under Steady State conditions is 85 °C/W.



HALOGEN

Available





Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static						1	
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 V, I_{D} = 250 \mu A$	60			V	
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$			55			
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I _D = 250 μA		- 6.3		mV/°C	
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_{D} = 250 \ \mu A$	1.5		2.5	V	
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA	
	I _{DSS}	$V_{DS} = 60 \text{ V}, V_{GS} = 0 \text{ V}$			1		
Zero Gate Voltage Drain Current		$V_{DS} = 60 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 55 ^{\circ}\text{C}$			10	μΑ	
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge 5 \text{ V}, \text{ V}_{GS} = 10 \text{ V}$	25			Α	
	_	V _{GS} = 10 V, I _D = 4.6 A		0.030	0.036	Ω	
Drain-Source On-State Resistance ^a	R _{DS(on)}	$V_{GS} = 4.5 \text{ V}, \text{ I}_{D} = 4.2 \text{ A}$		0.035	0.043		
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 4.6 A		20		S	
Dynamic ^b	•						
Input Capacitance	C _{iss}			1100		pF	
Output Capacitance	C _{oss}	V _{DS} = 30 V, V _{GS} = 0 V, f = 1 MHz		90			
Reverse Transfer Capacitance	C _{rss}			55			
Total Gate Charge	Qg	$V_{DS} = 30 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 4.6 \text{ A}$		21	32	32 16 nC	
				10.5	16		
Gate-Source Charge	Q _{gs}	$V_{DS} = 30 \text{ V}, V_{GS} = 4.5 \text{ V}, I_{D} = 4.6 \text{ A}$		3.5			
Gate-Drain Charge	Q _{gd}			4.2			
Gate Resistance	R _g	f = 1 MHz		3.3	5	Ω	
Turn-On Delay Time	t _{d(on)}			20	30		
Rise Time	t _r	V_{DD} = 30 V, R_L = 5.4 Ω		150	225		
Turn-Off DelayTime	t _{d(off)}	$I_D \cong 5.6 \text{ A}, \text{ V}_{\text{GEN}}$ = 4.5 V, R_g = 1 Ω		20	30		
Fall Time	t _f			60	90		
Turn-On Delay Time	t _{d(on)}			10	15	ns	
Rise Time	t _r	V_{DD} = 30 V, R_L = 5.4 Ω		15	25	-	
Turn-Off DelayTime	t _{d(off)}	$I_D \cong 5.6 \text{ A}, V_{GEN}$ = 10 V, R_g = 1 Ω		25	40		
Fall Time	t _f			10	15		
Drain-Source Body Diode Characterist	ics	•	•				
Continous Source-Drain Diode Current	۱ _S	T _C = 25 °C			4.2	٨	
Pulse Diode Forward Currenta	I _{SM}				25	A	
Body Diode Voltage	V _{SD}	I _S = 2 A		0.8	1.2	V	
Body Diode Reverse Recovery Time	t _{rr}			25	50	ns	
Body Diode Reverse Recovery Charge	Q _{rr}			25	50	nC	
Reverse Recovery Fall Time	t _a	$I_F = 5.5 \text{ A}, \text{ dI/dt} = 100 \text{ A/}\mu\text{s}, T_J = 25 \text{ °C}$	= 25 °C	19		-	
Reverse Recovery Rise Time	t _b	1		6		ns	

Notes:

a. Pulse test; pulse width \leq 300 $\mu s,$ duty cycle \leq 2 %.

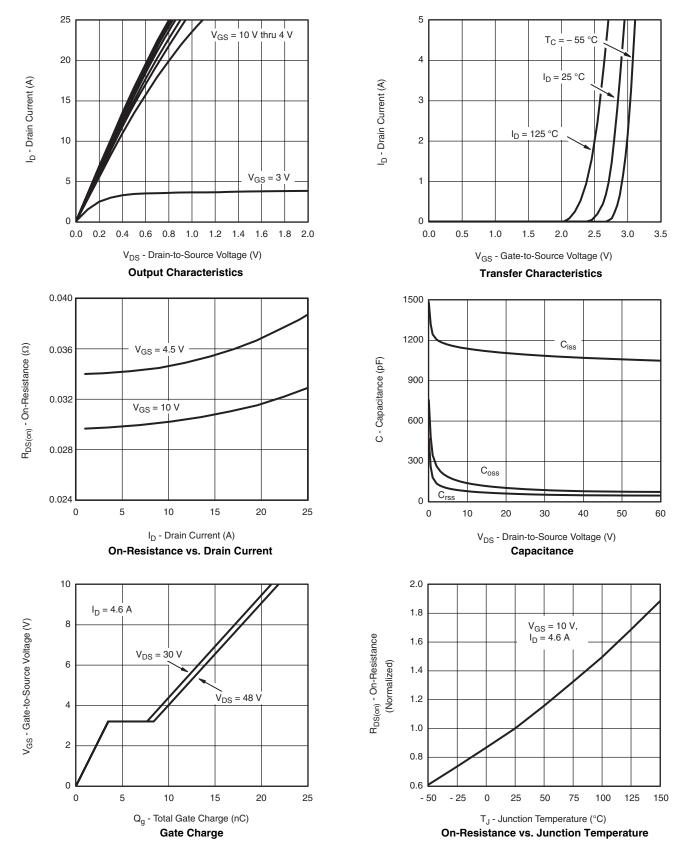
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



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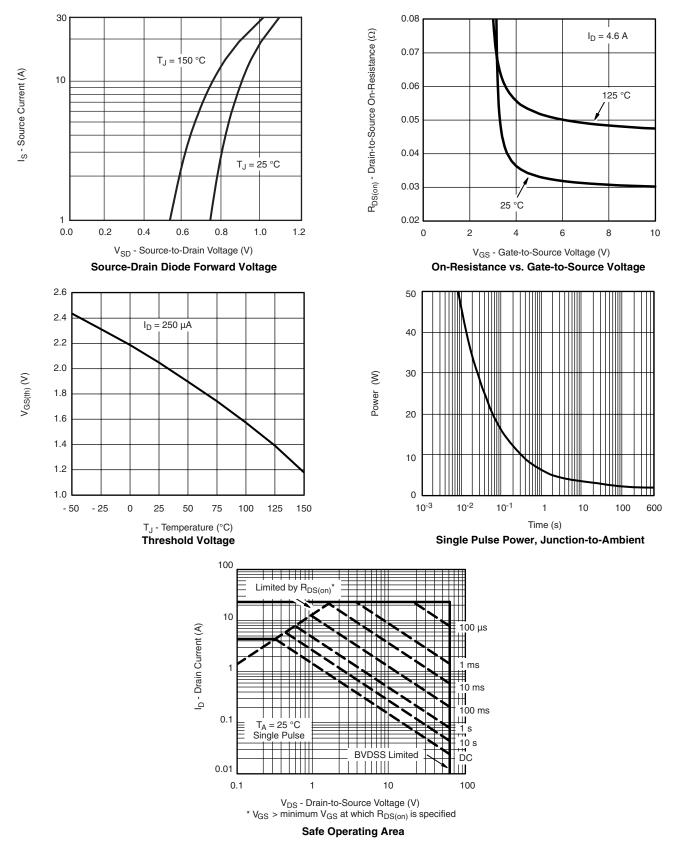


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TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

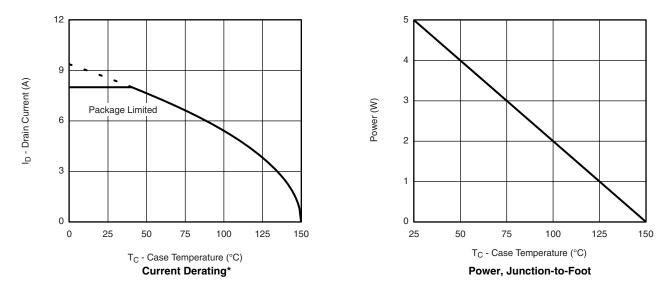






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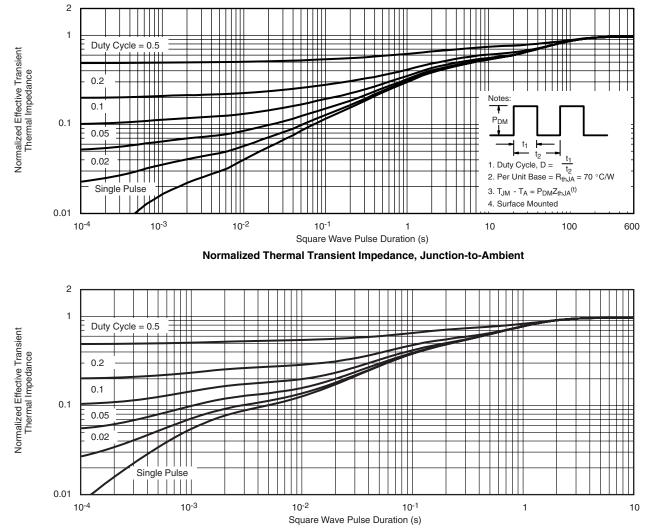


* The power dissipation P_D is based on $T_{J(max)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

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TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Foot

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <u>www.vishay.com/ppg?73664</u>.



Package Information

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SOIC (NARROW): 8-LEAD JEDEC Part Number: MS-012





	MILLIM	IETERS	INCHES			
DIM	Min	Мах	Min	Max		
A	1.35	1.75	0.053	0.069		
A ₁	0.10	0.20	0.004	0.008		
В	0.35	0.51	0.014	0.020		
С	0.19	0.25	0.0075	0.010		
D	4.80	5.00	0.189	0.196		
E	3.80	4.00	0.150	0.157		
е	1.27 BSC		0.050 BSC			
н	5.80	6.20	0.228	0.244		
h	0.25	0.50	0.010	0.020		
L	0.50	0.93	0.020	0.037		
q	0°	8°	0°	8°		
S	0.44	0.64	0.018	0.026		
ECN: C-06527-Rev. I, 11-Sep-06 DWG: 5498						

Application Note 826

Vishay Siliconix



RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads Dimensions in Inches/(mm)

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